

pressors. These can easily be used as inlet valves, because the proper point of opening and closing is fixed or very nearly so. But in the case of discharge valves some provision must be made to allow the valve to open at the time when the pressure in the cylinder is equal to the pressure on the other side of the valve. In the Norwalk Compressor shown in Fig. 20, Corliss valves are used on the L.P. cylinder. The pressure of the discharge from the L.P. cylinder of a compound compressor is fixed, so that in this case no special provision is necessary.

Fig. 31 shows two views of the cylinder of a blowing engine designed for a pressure of four pounds per square inch. It is built by the Philadelphia Engineering Works. The discharge valve is double ported to give a large opening with a small valve movement. As the double port increases the clearance it is not used for high pressures. The inlet valve of this cylinder is operated directly by a rod attached to the wrist plate. The discharge valve is closed positively, but is opened by air pressure, by means of an auxiliary cylinder and piston. These can be seen just above the upper valve-arm, in the end view, Fig. 31.

Some of the advantages of Corliss valves are the large opening, which permits the cylinder to be filled with cool air at nearly atmospheric pressure, and the positive movement, which enables the compressor to be run at a high speed. Their disadvantages lie in their well-known tendency to wear and become leaky, in the difficulty of repair, in the large clearance, and in the weakening of the cylinder heads by the long ports. The wear of the valve may be partially obviated by using it for low pressures only and by having the movement take place only when the pressure is nearly balanced on the two sides. In the Nowalk compressor (Fig. 20) the Corliss valves are used on the low-pressure cylinder only. In addition to this, the discharge valves have a pair of cams interposed between the eccentric rod and the valve-arm, so arranged that the valve stands still until the pressure is nearly balanced. In the compressors of the Philadelphia Engineering Works (Fig. 31) the discharge valve opens automatically when the pressure is balanced, and closes before much pressure comes on it.

Fig. 32 shows the air cylinder of the Ingersoll-Sergeant compressors. G G are the inlet valves, placed in the piston. They are without springs or mechanism of any kind, but are opened and closed by the motion of the piston. Their advantages consist in a large

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